

From Shock to Public Health Response:

Coming to Understand the Impact of the World Trade Center Disaster on Health



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On September 10, 2001, New York City and New York State had some of the best public health and disaster response capabilities in the nation.



In the immediate aftermath of the September 11, 2001 WTC attacks, the focus was on saving lives and immediate catastrophe management.

Tens of thousands of public servants
rushed to Ground Zero...



Tens of thousands of private sector workers
and volunteers also came to help



While an estimated 100,000 local workers
and residents were in the area



Over the next weeks, as rescue, recovery and restoration of essential services occurred, concerns began to mount over the potential health effects of the disaster



What Were the Exposures?

- Dust
- Smoke
- Physical Hazards
- Extreme Psychological
traumatogens

WTC Exposures



The exposure mix (partial list):

- Pulverized cement, gypsum
- Pulverized glass
- Asbestos
- Silica
- Fibrous glass
- Heavy metals
- Volatile organic compounds
- Organic products of the combustion of 100,000 L of jet fuel (PAHs, etc)

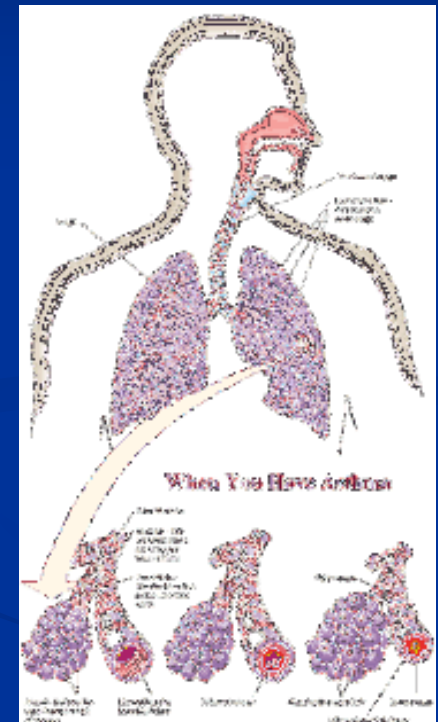
COEM Initial Clinical Findings

Lower airway disorders, including:

Asthma and asthma variants

Chronic dry cough

Aggravated pre-existing chronic lung disease



COEM Initial Clinical Findings

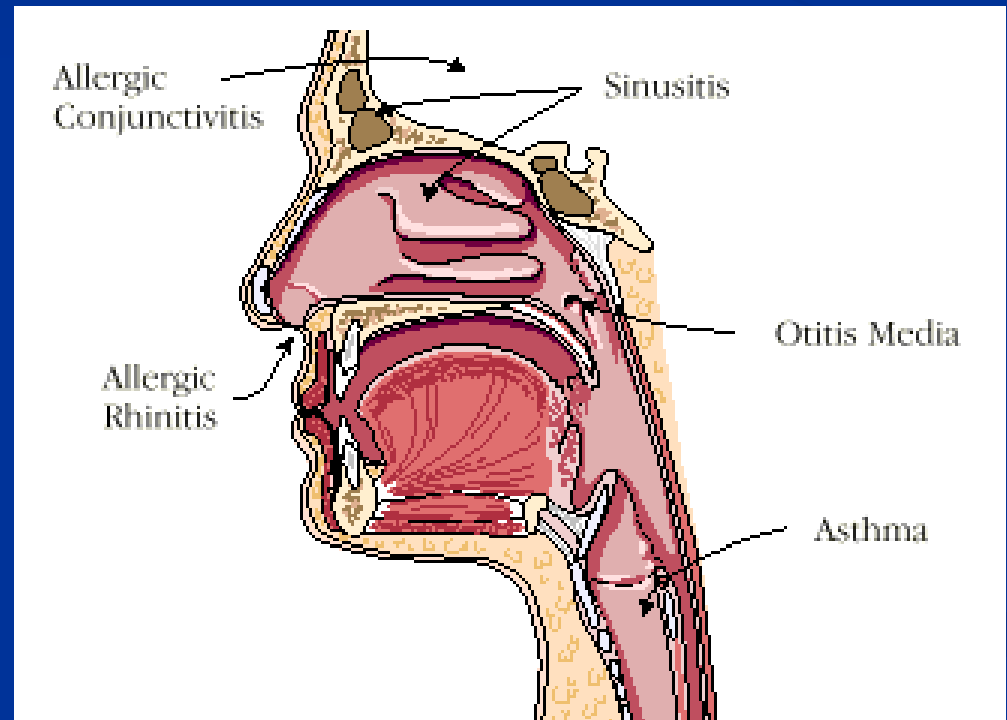
Upper airway disorders, including:

Rhinitis

Sinusitis

Pharyngitis

Laryngitis



Psychological and Socioeconomic Consequences

- Psychological effects
 - PTSD
 - Anxiety
 - Depression
- Social and economic consequences
 - Loss of employment due to physical and/or mental health conditions, economy
 - Impact of family function
 - Increase in substance/alcohol use

The Mount Sinai World Trade Center Worker and Volunteer Medical Screening/Monitoring Programs

Based on the initial clinical work, we knew
that larger scale medical monitoring and
treatment programs would be essential

The WTC Worker and Volunteer Screening/Monitoring Programs

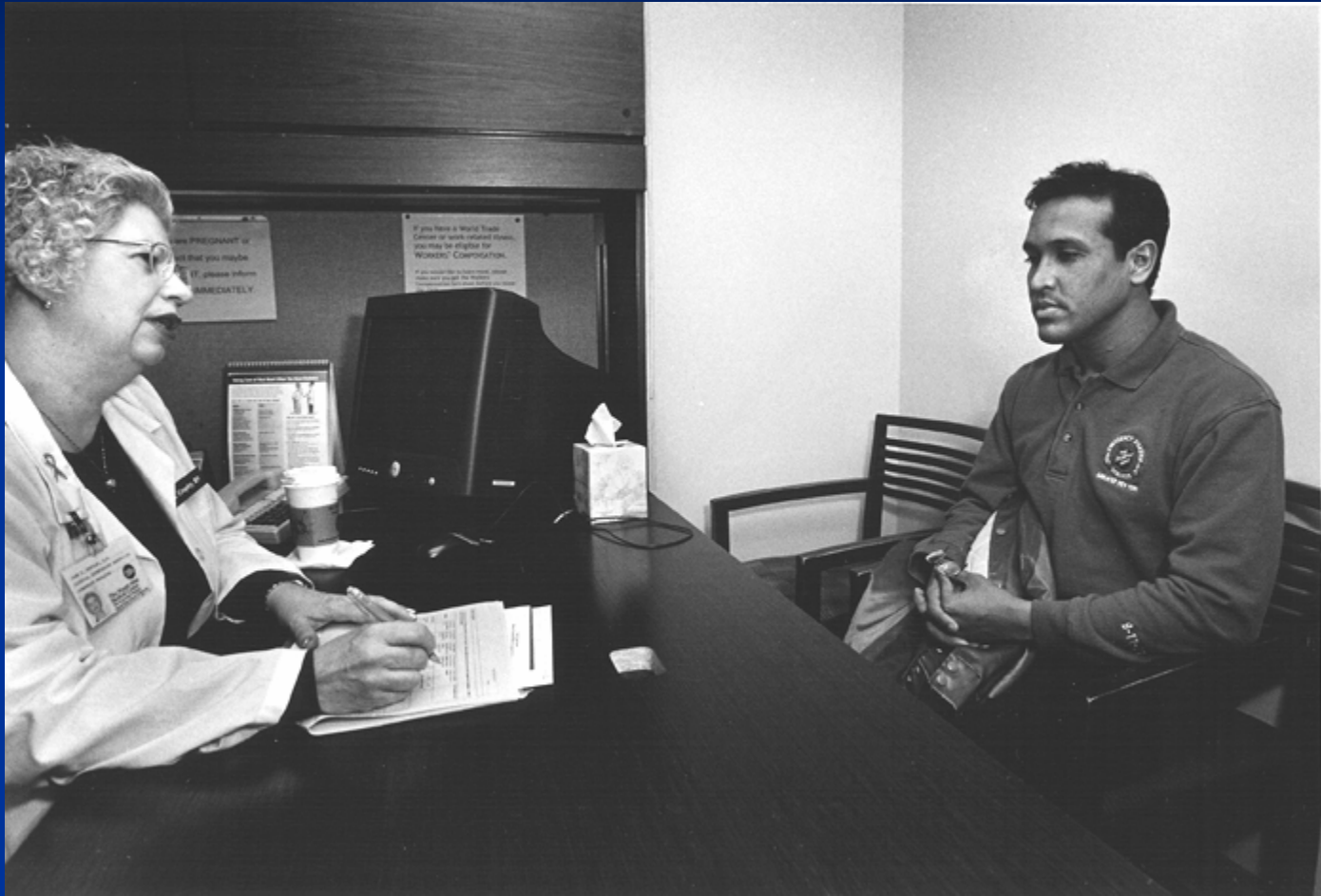
- Established with funding through NIOSH
- Goal: a clinical program to provide free standardized screening exams to WTC responders in the New York/ New Jersey area, as well as across the nation
- Examination purposes:
 - To identify current WTC-related physical and mental health problems
 - To provide baseline and periodic surveillance examinations
 - To provide referrals for treatment

Who Was Examined?

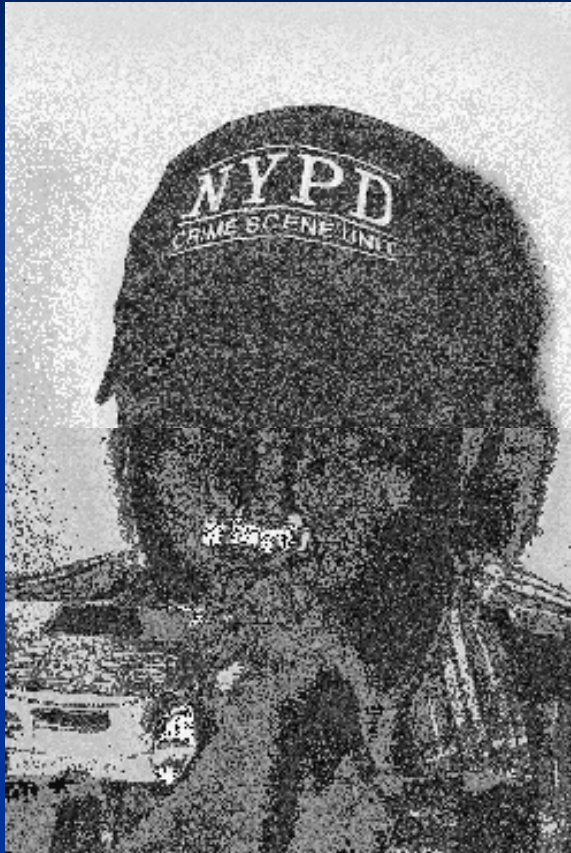
- A large and extremely heterogeneous population including “traditional” first responders, including:
 - Firefighters,
 - Paramedics, and
 - Law enforcement officers
- as well as a diverse population of “non-traditional” responders:
 - Construction workers
 - Laborers and clean-up workers
 - Telecommunications workers
 - Public sector workers (DOT, Parks, etc)
 - Volunteers

Exam components

- Standardized medical and exposure interviews
- Physical Examination
- Mental health assessment
- Chest x-ray
- Spirometry (pre and post bronchodilator)
- CBC, blood chemistries, UA







**MORE THAN 16,500
RESPONDERS HAVE BEEN
EXAMINED!!!**

July 2002–September 2006

Environmental Health Perspectives

Online September 6 2006

The World Trade Center Disaster and the Health
of Workers: Five Year Assessment of A Unique
Medical Screening Program

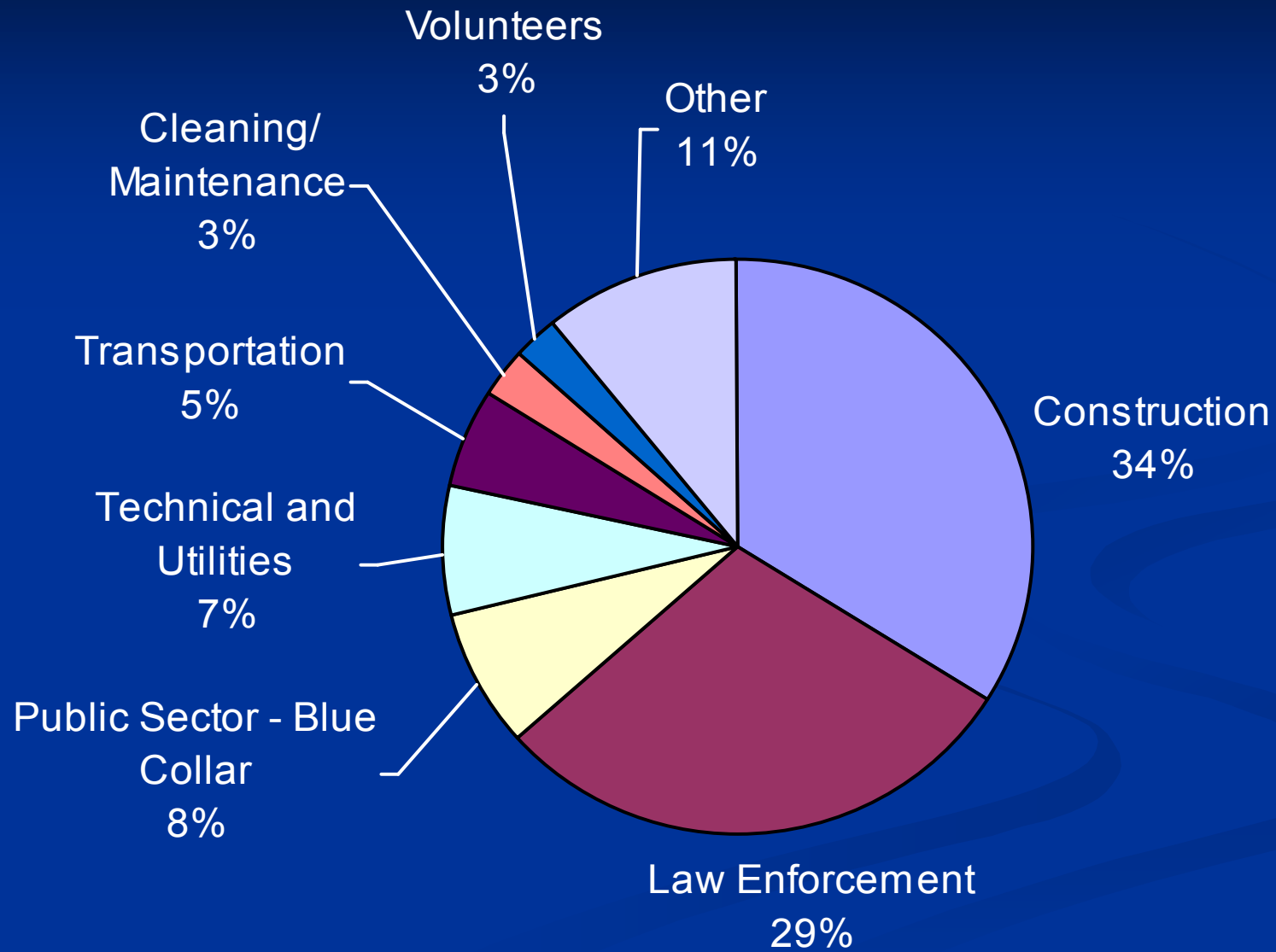
Herbert R, Moline J, Skloot G, Metzger k, Baron S, Luft B, Markowitz S, Udasin I, Harrison D, Stein D, Todd A, Enright P,
Stellman J, Landrigan P, Levin S

Characteristics of the Group

- 9,422 WTC responders who provided HIPAA/IRB consent and who were examined 7//02-4/04
- Mostly male (87%)
- Median age 42 (range 18-82)
- Mostly union members (86%)
- 14% received exams in languages other than English
- 40% worked on WTC-related efforts on 9/11/01 , 70%: 9/11- 9/13/01

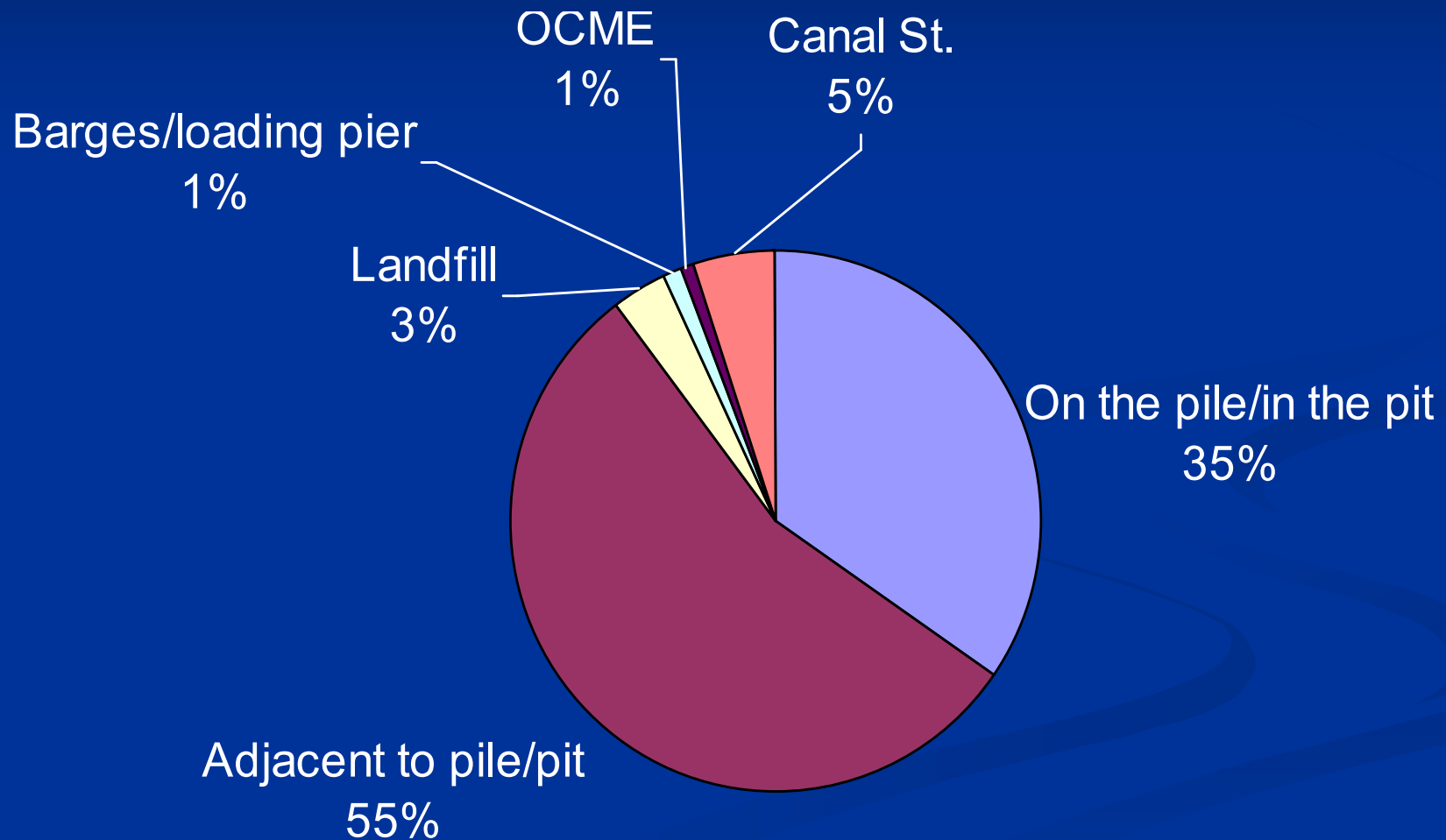
Who Was Examined?

(n = 9,442)



Location of majority of work among the WTC MSP

Responders n=9,442



WTC Medical Screening Program

July 2002- August 2004

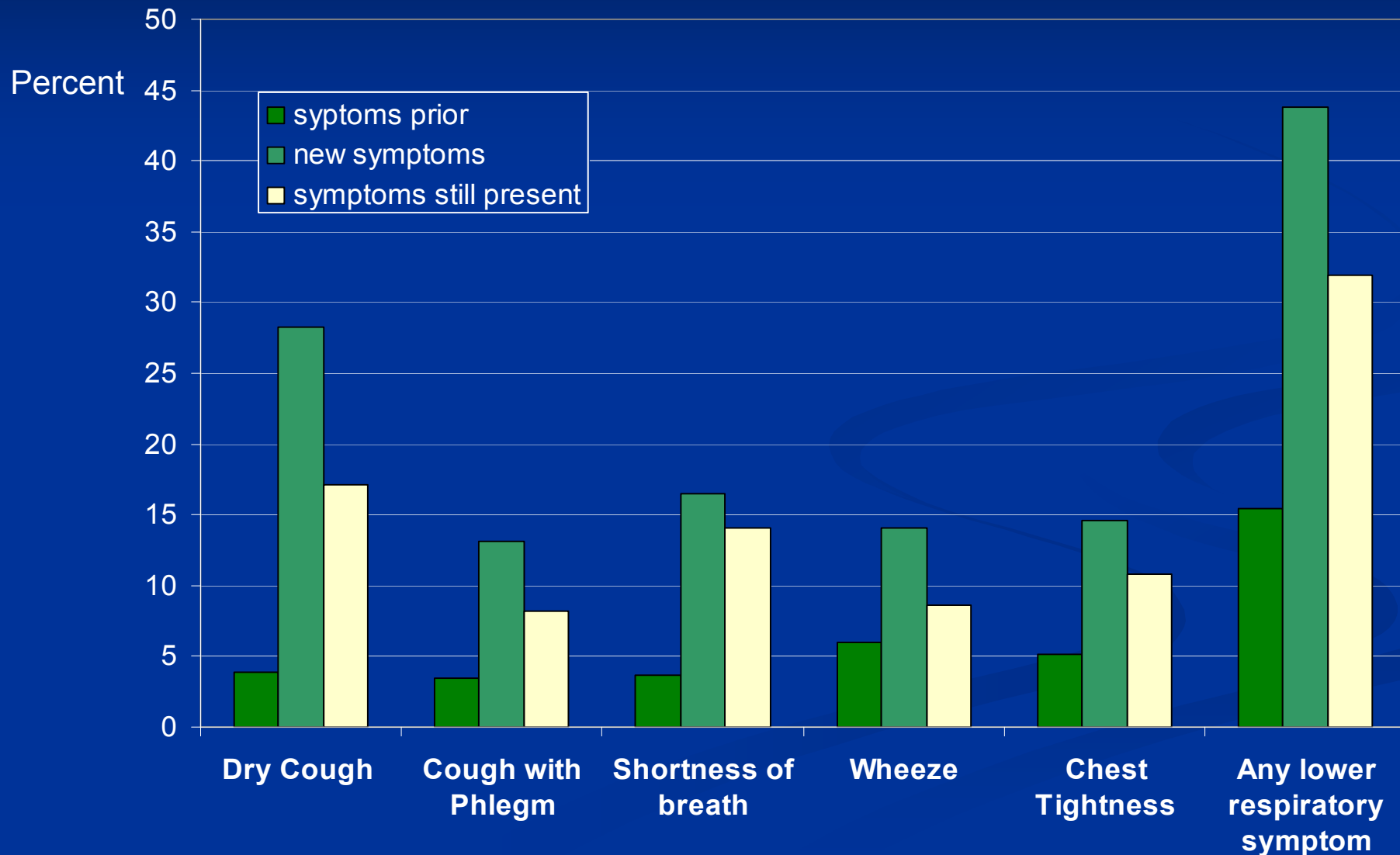
Published in EHP, September 2006

- 69% of all responders reported having had at least one WTC-worsened or newly incident respiratory symptom while performing response work.
- At the time of examination, 59% were still experiencing a new or worsened respiratory symptom
- One third had abnormal breathing tests, which was a percentage far higher than we had expected
- Among non-smokers, the rate of PFT abnormalities was twice the expected rate

Lower Respiratory Symptoms

- 85% of the responders reported being asymptomatic for lower respiratory tract symptoms in the year prior to 9/11.
- Of these 44% reported developing lower respiratory symptoms while engaged in WTC-related work and
- 32% are still experiencing lower respiratory symptoms at the time of their exams.

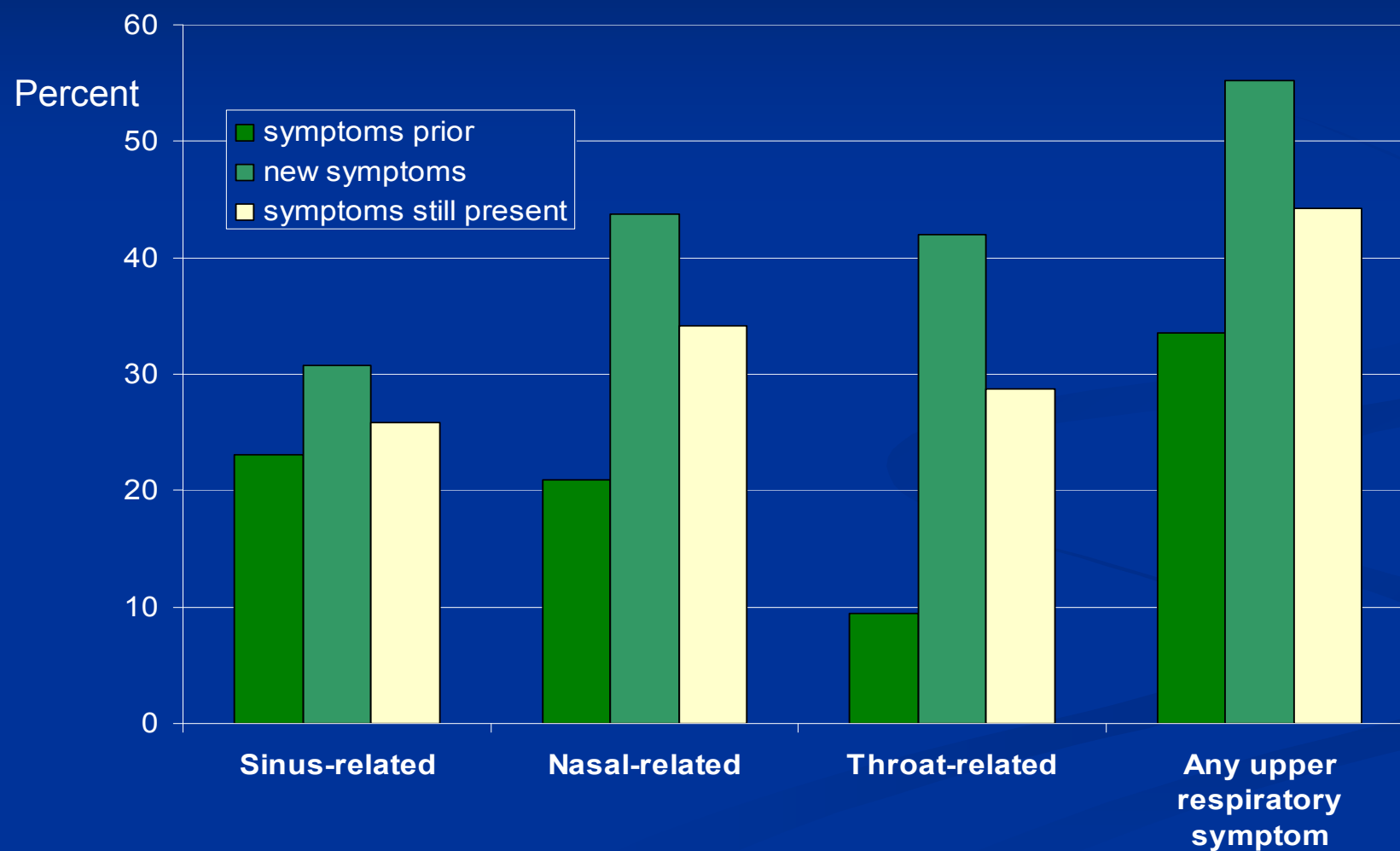
Prevalence of lower respiratory symptoms among the WTC MSP Responder Population (n=9,442)



Upper Respiratory Symptoms

- 66% reported being asymptomatic for upper respiratory tract symptoms in the year prior to 9/11/01
- Of these previously asymptomatic responders 55% developed upper respiratory symptoms and
- 44% are still experiencing these symptoms

Prevalence of upper respiratory symptoms among the WTC MSP Responder Population (n=9,442)



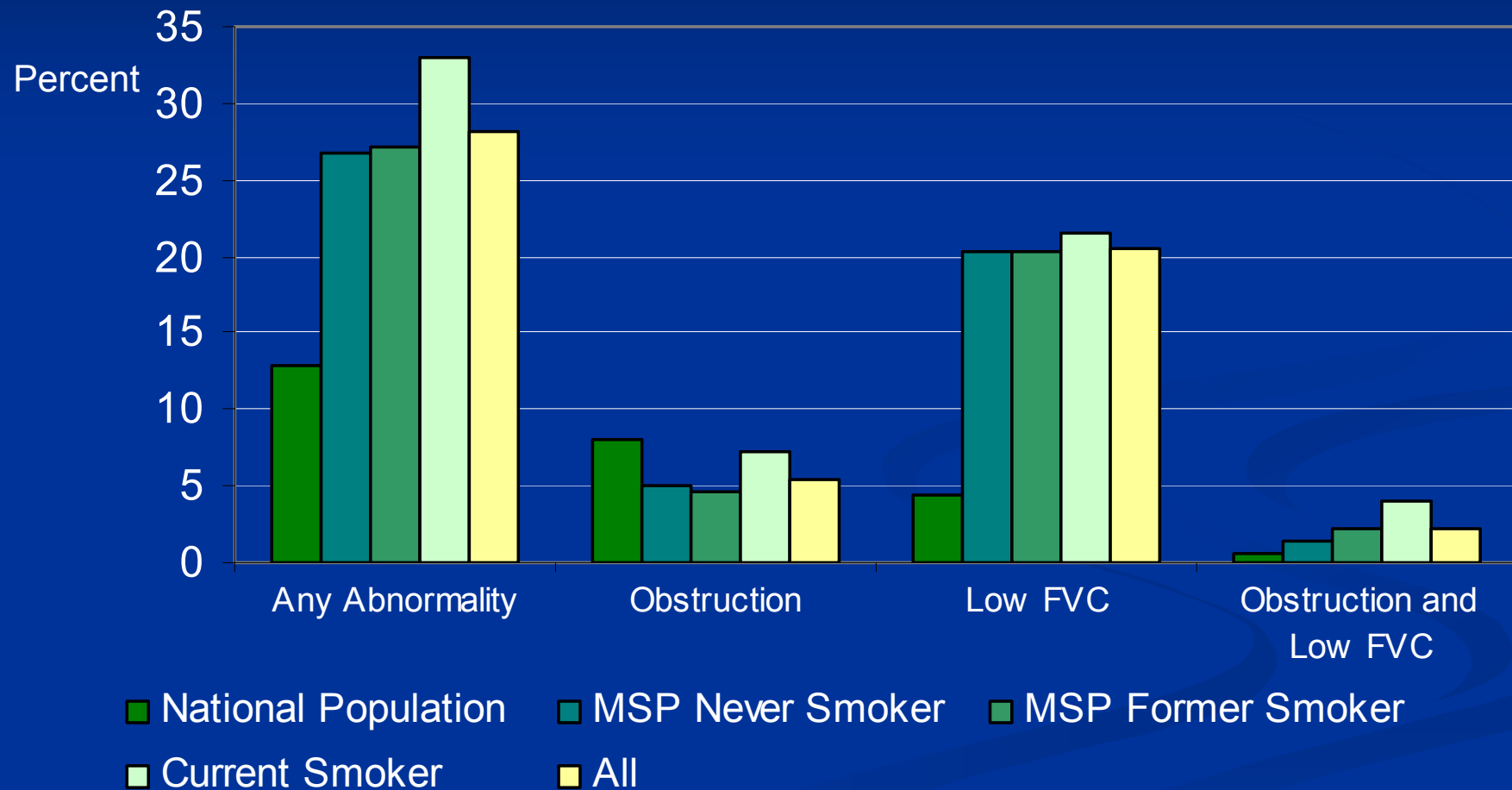
Pulmonary Function Tests

(8,384 patients)

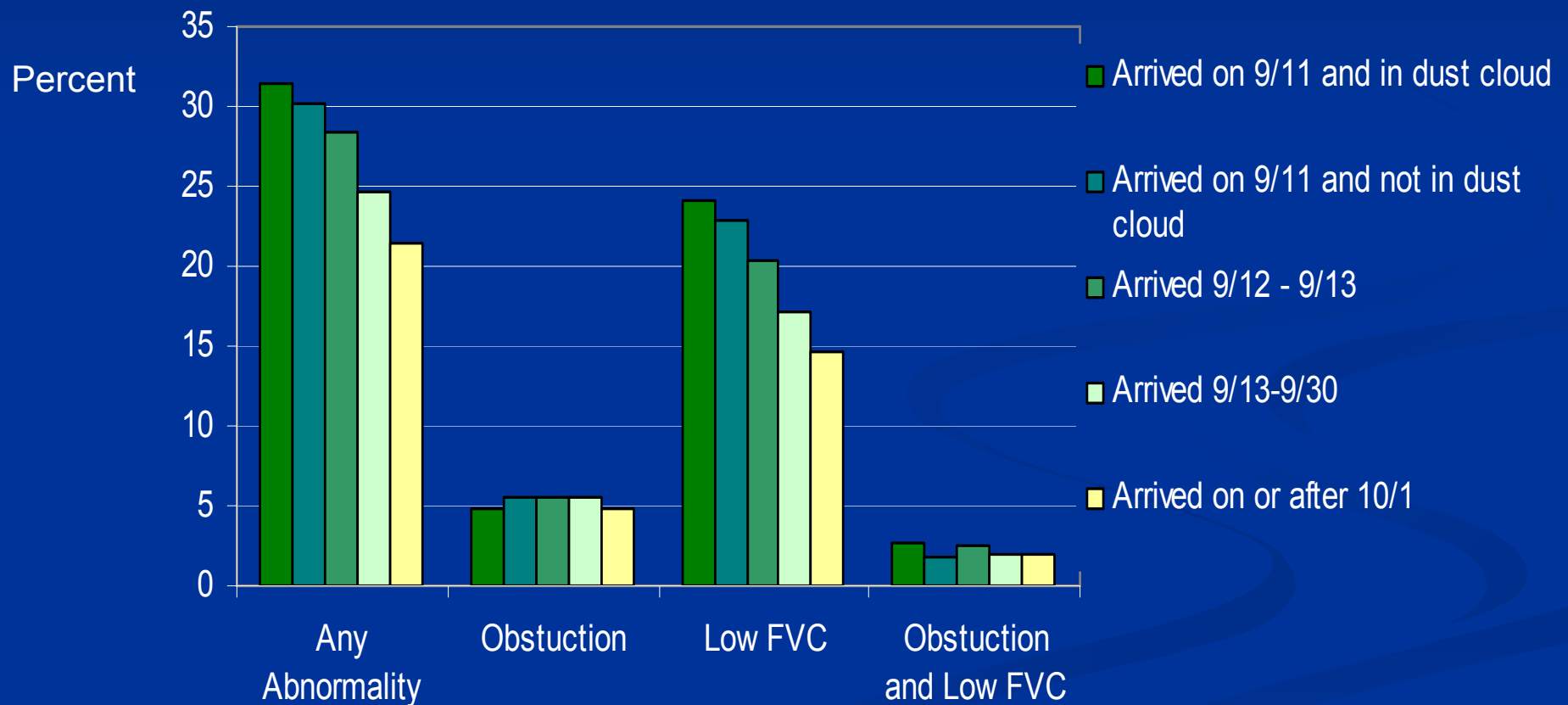
- Breathing tests (spirometry): 28% abnormal
- Among non-smokers: 27 % abnormal;
the general non-smoking population rate is 13%

Spirometry Results among the WTC Medical Screening Program Study Population

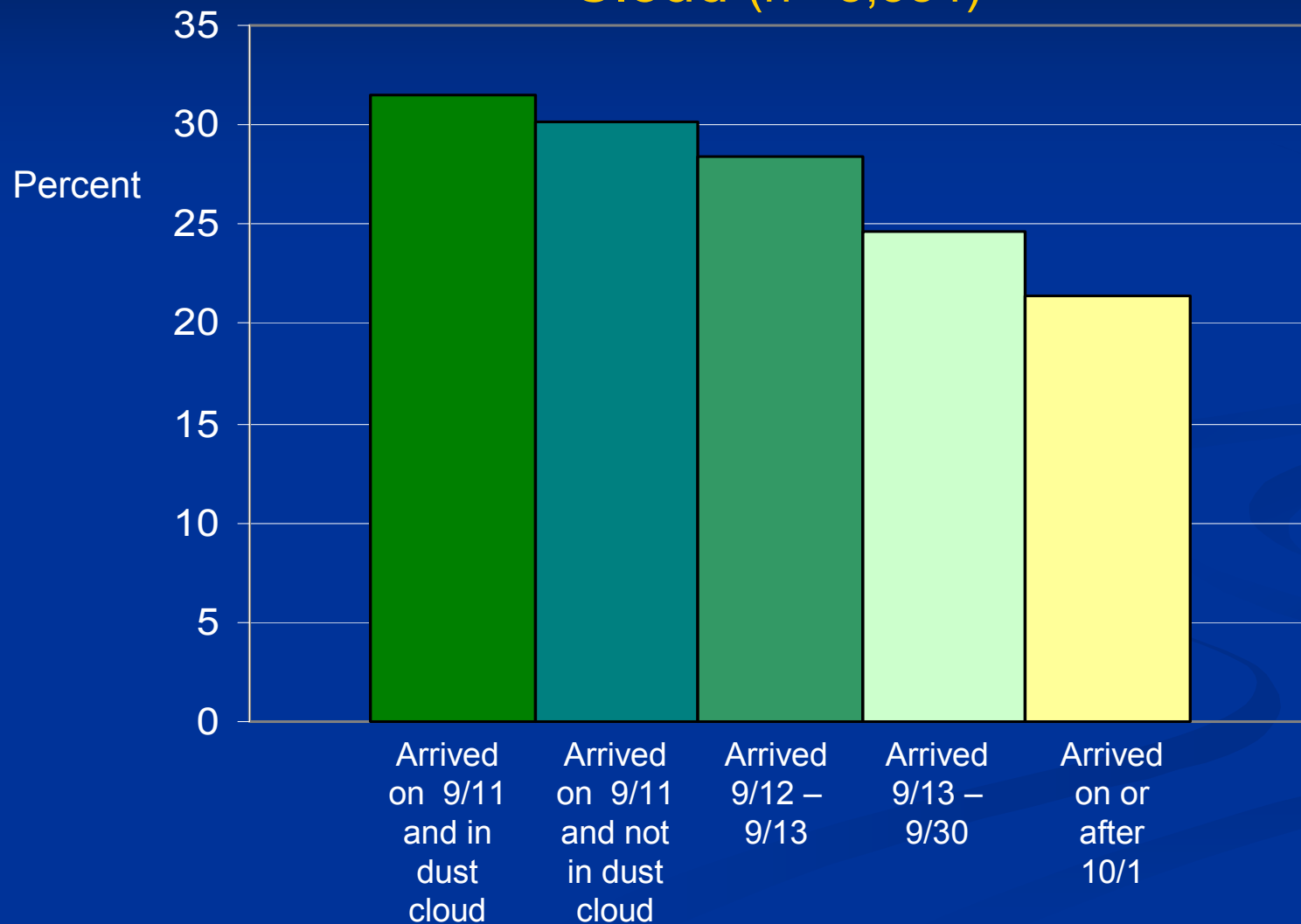
(n= 8,384)



Spirometry Results by Date of Arrival at the WTC Site and Exposure to the Dust Cloud (n= 8,384)



Prevalence of Any Spirometric Abnormality by Date of Arrival at the WTC Site and Exposure to the Dust Cloud (n= 8,384)



The Mount Sinai WTC Health Effects Treatment Program

Provides medical care and advocacy without charge for responders with WTC-related health effects.

Between January 2003 to present, the HETP has provided:

- 7249 medical services to 2019 patients
- 4732 social work services to 1524 patients
- Extensive referral program to other clinical services

The Mount Sinai WTC Health Effects Treatment Program

August 2005 – July 2006

- 84% are suffering from some kind of upper respiratory illness, such as chronic sinusitis.
- 47% have persistent lower respiratory problems such as asthma and WTC cough.
- 64% have some kind of gastrointestinal illness, mostly gastroesophageal reflux.
- 37% have persistent mental health consequences related to the WTC disaster, including depression and post-traumatic stress disorder.
- 31% have chronic musculoskeletal problem, often from injuries that occurred when working on the “pile”.

Current Services Offered

- World Trade Center Medical Monitoring Program: Free, comprehensive and confidential exams – baseline and follow up
- World Trade Center Treatment Programs
No out of pocket expenses , treatment for WTC physical and mental health conditions

Lessons Learned: Clinical

- Pattern of upper and lower respiratory and mental health symptoms seen is similar to that seen among NYFD, other workers, residents and building re-occupants
- The physical health conditions are consistent with health effects of highly alkaline irritant exposure
- Upper and lower respiratory (and psychological) symptoms remain persistent years after exposure ends

Lessons Learned

- Pay attention to early clinical findings
- Create a roster of responders, including a system for long-term tracking
- Rapidly establish a medical monitoring and treatment program
- Establish nationwide services as needed

Lessons Learned

- Include benefits counseling in addition to physical and mental health services.
- Involve the constituents in the establishment of the program
- Assess and plan for the diversity of the responder population, including language and literacy needs
- Provide emergency response/ personal protective equipment training as needed.

Lessons Learned

- Assess and plan for responders' other exposures (workplace other disaster work, etc)
- Communicate clinical findings broadly (to constituents, health care providers, governmental authorities)
- Adhere to the Precautionary Principle of Public Health:
 - Assume the risk is real until information to the contrary is available

Acknowledgements

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- Our funders: NIOSH/CDC, American Red Cross Liberty Fund/Recovery Grant Program, September 11th Fund, Bear Stearns Charitable Trust, Robin Hood Relief Fund
- OUR WTC RESPONDER PATIENTS!